entirely disappeared from the nodes of the reproductive axis.

Briefly, the author's hypothesis is that the primitive monocotyledon was a segmented plant, composed of phytomeres, and characterized by the presence of concentric bundles at the nodes. Probably as the result of periodically recurring unfavorable conditions of existence, the primitive segmented type of stem became differentiated into vegetative and reproductive portions of very different structure. The vegetative part of the stem gradually became characterized by tufted leaves and short internodes, resulting finally in the fusion of the nodal segments, containing concentric bundles to form a continuous system. In the reproductive axis of the lower groups of Monocotyledons, on the other hand, the ancestral division of the stem into distinct phytomeres is retained, together with the recurring segments of concentric bundles. In the higher monocotyledons, however, the primitive organization disappears and concentric bundles are no longer found in the reproductive axis.

The hypothesis outlined above is based on the study of a considerable number of facts, and, further, seems to gain force from two considerations. In the first place, it agrees on the whole very well with the data supplied by a study of the floral organs. Secondly, a typical cambium has been found in the reproductive axis and seedlings of some of the lower monocotyledonous orders mentioned above. The latter feature is reserved for subsequent consideration, but it may be pointed out that this discovery lends support to the opinion recently expressed by Queva, in connection with his anatomical studies on the Uvulariaceæ, viz., that the Monocotyledones are derived from the Dicotyledones, or an equivalent stock, by the loss of a cambium and an increase in the number of leaf-traces.

W. F. Ganong,
Secretary.

SCIENTIFIC BOOKS.

Morphogenetische Studien. Als Beitrag zur Methodologie Zoologischer Forschung. By Tad. Gabrowski. Gustav Fischer. 1903.

Gabrowski publishes under the above title a quarto monograph of which the first 24 pages deal with the structure of *Trichoplax adhærens,* 9 pages with the biology of this animal, and 141 pages of general discussion.

In regard to the structure of *Trichoplax* very little that is essentially new is added. The organism is disc-shaped and, as a rule, irregular in outline. It has an outer layer of ciliated ectoderm, and an internal spongy parenchyma. It lacks completely digestive tract, reproductive organs and nervous system. Some of the parenchyma cells, although not differentiated into muscles, are probably contractile, and cause the changes in the shape of the body.

Trichoplax moves slowly over solid bodies by means of the long cilia on its under surface. No food particles of any sort have ever been found in the body, and the author's only suggestion is that the food may be soluble organic matter absorbed from the surrounding water; but this is purely conjectural, and nothing new was discovered as to the probable source of food.

Reproduction is by division into two pieces; the body drawing away in two directions until the connecting part is finally broken. Gabrowski has also seen two, and even three, individuals come together and fuse into a single mass, for which process he suggests the use of the term concrescence—a term that has acquired a very different meaning, and it seems unfortunate to apply it to this process of fusion.

A long discussion of the affinities of *Trichoplax* leads the author nowhere, since no new facts of any significance have been added by his work and the speculation is not particularly illuminating. Even less impressive is the long, heavy discussion of the gastrula theory which is painfully dragged through

37 pages. All the old, threadbare opinions and speculations that have formed the staple of embryological literature for the last twenty-five years are tediously passed in review—only once more to reject the gastrula theory, a conclusion already reached by so many writers that it would be tiresome merely to cite their names.

The germ-layer definition is 'analyzed,' by which is meant more empty surmising. Finally the reader, if he has not long since lost interest in the protracted discussion, is rewarded by a sort of diversion on 'physiological morphology,' where more commonplace and vacuity are in order.

When morphologists, on the slender basis of a few, new, trivial histological details, can trespass on the time of their fellow-workers to the extent of 174 quarto pages of antiquated discussion, it is, indeed, time to fly from such company and seek new fields where the length of a contribution may be expected to bear some relation to the importance of the discoveries. T. H. M.

Biological Laboratory Methods. By P. H. MELL. Pp. xii + 321. New York, The Macmillan Co. 1902.

It is difficult in a brief statement to do justice to the work of Dr. Mell. We may, however, find the task simplified when we realize that a very considerable amount of the space is devoted to the 127 figures, many of large size, almost all of which are taken from the catalogues of dealers in laboratory and microscopic supplies, and in other apparatus more or less pertinent to the needs of the biologist. Indeed, the addition of an appendix containing a list of prices would have rendered the publication of catalogues by these dealers for some time hereafter a work of gratuity.

For the rest of the book—say sixty per cent. —it may be said to contain a detailed account of a large number of photographic and microscopic apparatus and methods for most of which the beginner in biology—for whom the work is intended as a text-book in a strict sense—will scarcely have use. The same may be said of the very numerous directions for the preparation of tissues. It is remarkable in such a text-book, the rationale of which is to enable the beginner to 'build only the foundation' of biological study, that the for him more simple and useful methods of making simple microscopic preparations of fresh tissues are chiefly omitted. But, of course, we are rapidly passing beyond the pitiable simplicity of ante-microtomic days. The young student of nowadays will, with Dr. Mell's book, get an elaborate knowledge of chromatic aberration and numerical apertures. He will then devote himself to a careful and somewhat exhaustive study of microtomes, following which he will address himself to the numerous special methods of killing, hardening, clearing, imbedding and the like, and of photography, bacteriological methods, injection, maceration and polarization in the order named. The student, having mastered these things, will then presumably be ready for the study of biology in the narrower sense, that, namely, of plants and animals themselves. F. E. LLOYD.

Oeuvres Complètes de J.-C. Galissard de Marignac; Hors-série des Mémoires de la Société de Physique et d'Histoire Naturelle de Genève. Geneva, Ch. Eggiman et Cie; Paris, Masson et Cie, et al. Vol. II. 4to. Pp. 840.

This volume completes the admirably executed reprint of the researches of the great Swiss chemist, the first volume of which was reviewed by SCIENCE on January 16, 1903 (p. 111). The final volume contains Marignac's most important memoirs on atomic weights, a number of interesting and clear-sighted papers concerning various rare elements, several critiques and many papers upon physico-chemical subjects, including his important researches on the specific heats of solutions. At the end is a list of the atomic weights determined by Marignac, in parallel column with the 'International' values of 1903—a comparison which redounds greatly to Marignac's credit. A classified index covering both volumes completes the collection, leaving nothing to be desired. The editor, M. E. Ador, is much to be congratulated on the success of his work.

THEODORE WILLIAM RICHARDS.